

*Request for Proposals to Provide*

# Offshore Investigation Services

## Sparrows Point Environmental Trust

*Prepared for*

Sparrows Point Trust  
Maul Foster & Alongi, Inc.  
400 E Mill Plain Blvd., Suite 400,  
Vancouver, WA 98660

*Prepared by*



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Turner Station

Active  
Stormwater Outfall

Historic Fill Area  
of Slag

Grey's Landfill

Active  
Stormwater Outfalls

Rod and Wire  
Mill Area

Phase 1 Northwest Shoreline

Inactive  
Stormwater Outfall

Humphrey's  
Impoundment  
(Historic Fill Area)



## **1.0 Qualifications**

### **1.1 Experience and Qualifications Relevant to the Scope of Work**

EA Engineering, Science, and Technology, Inc. (EA) is an employee-owned firm that was founded in Baltimore in 1973. Today, we have nearly 450 employees located in 23 offices nationwide and provide a full range of environmental investigation, design, construction oversight and technical support services. EA has annual sales of \$136 million, 50 percent of which is derived from environmental remedial investigation, remediation, and restoration services. Our staff of nearly 250 in Hunt Valley, Maryland, has conducted water quality and sediment investigations in Baltimore Harbor for the U.S. Army Corps of Engineers (USACE) and the Maryland Port Administration (MPA) for over 25 years, and have developed respected, trust-based, and results-oriented relationships with the regulatory staffs of the Maryland Department of the Environment (MDE) and U.S. Environmental Protection Agency (USEPA) Region 3.

Our proposed local project team offers their personal experience in conducting many of the same study elements requested by the Sparrows Point Environmental Trust (Trust), at the adjacent Coke Point offshore area of Sparrows Point. This team conducted the field investigations in the Coke Point offshore area and prepared the *Final Risk Assessment of Offshore Areas Adjacent to the Proposed Coke Point Dredged Material Containment Facility at Sparrows Point*. Though prepared for the MPA, USEPA and MDE have accepted this risk assessment as fulfilling the Sparrows Point responsible party's obligation to assess human health and ecological risks in the Coke Point offshore area, pursuant to Resource Conservation and Recovery Act compliance requirements. Having designed the work plans, executed the field investigations, examined localized groundwater/surface water interactions, developed the methodology for risk assessment, and conducted the assessment in cooperation with regulatory agencies, the EA team is experienced and cognizant of the concerns, sensitivities, and priorities of the agencies.

EA's past experience, technical expertise, and local resources provide enhanced efficiency and accuracy for the proposed offshore investigation:

- Geologists, chemists, ecologists, modelers, and field staff with expertise in characterizing offshore sediment contamination, gained through work for USEPA Regions 3 and 5 and USACE, as well as MPA;
- Field equipment essential to conducting the scope of services available in-house;
- Staff that have already reviewed, as well as contributed to, the MDE Hazardous Waste website for Sparrows Point Steel Mill, which is referenced in the RFP;
- An in-house database of sediment, water quality, and ecological data covering the Coke Point offshore and surrounding Patapsco River area; and
- An intimate understanding of chemical distribution, fate, and transport processes in the area.

EA's familiarity with the project area, the models, and the existing data set structure will expedite data analysis, minimize learning curves, and provide consistency in data quality and assessment techniques. The methods and approaches for the ecological risk assessment (ERA) and human health risk assessment (HHRA) models developed for Coke Point by EA are proposed for use in evaluating the information acquired in this program. Our team will efficiently update and modify the models to meet the needs of the Trust's project.

### **1.2 Project Summaries**

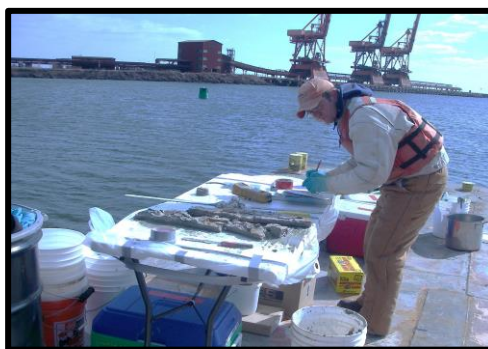
EA's experience in performing similar work is exemplified by the following projects: 1) the Offshore Assessment, Risk Assessment, and Corrective Measures Study for the Proposed Coke Point Dredged Material Containment Facility; 2) Evaluation of Dredged Material from the Baltimore Harbor and Channels, Maryland; and 3) our Great Lakes Architect-Engineer Services (GLAES) contract. A summary including client references for each contract follows.

***Site Investigation, Offshore Assessment, Risk Assessment, and Corrective Measures Study for the Proposed Coke Point Dredged Material Containment Facility  
Maryland Port Administration, Sparrows Point, Baltimore Harbor, Maryland***

EA has successfully managed multiple task orders totaling over \$2.8M in support of MPA's evaluation of Sparrows Point. Investigations in support of MPA have focused on environmental conditions on the Coke Point Peninsula and the offshore areas of the Patapsco River surrounding Coke Point.

EA performed a multi-phase site investigation, including onshore and offshore subsurface drilling as well as sampling and analyses of soil, sediment, surface water, groundwater, and hydrocarbon product, to characterize areas of legacy contamination resulting from historic steel-making practices. EA's offshore work around Coke Point included extensive sampling for priority toxic substances, including metals, PAHs, PCBs, dioxins, and VOCs, in surface water, and both surface and subsurface sediment. This work included forensic analyses of PAHs to determine their sources. On the Peninsula, EA installed groundwater monitoring wells and collected subsurface soil samples to delineate the extent and sources of groundwater plumes. EA also prepared a corrective measures study for Coke Point.

A major component of EA's work has been modeling inputs from groundwater plumes into the Patapsco River. This has included mass flux and contaminant loading calculations for benzene and naphthalene. EA coupled outputs from hydrologic models with groundwater and surface water concentration data to develop and defend a conceptual site model of fate and transport.



EA created a groundwater flow model using Groundwater Modeling System (GMS) software with the USGS MODFLOW model. The model was calibrated to current site conditions, and groundwater flux in shoreline areas was used to provide inputs to surface water hydrologic models. Surface water transport was modeled using the USACE RMA2 model, and the entire Baltimore Harbor was included as part of the model domain. Historic tidal and flow data were compiled and used as model inputs. In addition to determining mass flux and loading, the model was used to estimate steady-state concentrations in the Harbor, and also to evaluate the effectiveness of sand capping in decreasing PAH flux from sediments. EA's characterization of impacts to sediment and surface water, combined with these analyses, yielded a valuable conceptual site model for Coke Point and surrounding areas.

An HHRA and an ERA were prepared for the offshore areas around the Coke Point Peninsula. The risk assessments evaluated the risks to humans and wildlife associated with ingestion of fish and crabs, based on chemical concentrations in field-collected fish and crabs and based on biouptake factors developed from laboratory bioaccumulation tests. A sensitivity analysis of the risk assessment evaluated various input parameters including exposure, background evaluations, and toxicity. The risk assessments determined which areas of the offshore contribute significantly to risk and identified where the greatest risk reduction would occur with remedial action. The results were presented in 12 public information sessions that involved elected officials, public interest groups, community group leaders, local press, and the general public.

EA developed a thorough understanding of the risks, sources, and transport mechanisms associated with the contaminant impacts, which will inform future decisions regarding methods to decrease exposure risks and associated contaminant flux to the Patapsco River.

Client Contact: Chris Correale, Principal, EcoLogix Group (MPA Consultant), 410-598-1158



***Chesapeake Bay Federal Navigation Channels – Dredged Material Testing, Placement Option Evaluations, and NEPA Compliance, U.S. Army Corps of Engineers***

EA has conducted various dredged material management services in federal navigation channels in the Chesapeake Bay for the U.S. Army Corps of Engineers (USACE) over the last 20 years. These services have included sediment characterization studies for new work, maintenance, and small navigation dredging projects; dredged material evaluations for upland, open water, and ocean placement; pathway analysis for beneficial use initiatives; and NEPA documentation to support dredging, beneficial use of dredged material, and placement site expansion.

EA has designed and completed sampling and analysis of sediments from over 200 locations throughout the Maryland and Virginia portions of the Chesapeake Bay, including all the deep draft navigation channels in Baltimore Harbor and the Chesapeake Bay leading to the Port of Baltimore, as well as multiple shallow-draft navigation channels. Sediments, pore water, and elutriate samples have been analyzed for the following chemical parameters: VOCs, SVOCs, metals, chlorinated and organophosphorus pesticides, PAHs, PCB Aroclors and congeners, dioxin/furan congeners, butyltins, cyanide, total sulfides, AVS/SEM, hexavalent chromium, ammonia, total phosphorus, and TOC.



The sediment characterization results are evaluated to determine which placement options are feasible for each channel. Material from Baltimore Harbor channels is evaluated for placement at confined disposal facilities in the harbor, while material from approach channels is evaluated for suitability for ocean placement or for placement at the Paul S. Sarbanes Poplar Island Environmental Restoration Project. Section 103 ocean placement evaluations included water column and whole sediment bioassays, bioaccumulation testing, and STFATE modeling. Suitability of material as a substrate for ecological restoration at the Poplar Island site was assessed by completing an ecological risk assessment.

To promote the usability of the data collected for the federal navigation projects, EA maintains a comprehensive sediment quality database that is frequently queried for comparative uses with various Chesapeake Bay and port development projects. EA conducted a statistical evaluation of the chemical results of the sediment analyses from the Upper Chesapeake Bay and Baltimore Harbor federal navigation channels, which was used to determine the variability of target analytes and to evaluate future priorities for analytical testing.

In addition to sampling, testing, and evaluation of the maintenance materials from the channels, other regional projects completed by EA in support of USACE dredged material management include the following:

- A contaminated sediment evaluation in the Southern Branch of the Elizabeth River, Virginia, that included physical and chemical testing of sediments from 490 sediment cores collected to a maximum depth of -39 ft. mean lower low water (MLLW).
- Baseline existing conditions studies to evaluate sediment quality, SAV, fisheries, and benthic community resources within the footprint of the proposed Poplar Island Expansion.
- Technical review of analytical sampling design, compliance with required analytical methods, and review of data quality objectives for sediment, water, elutriate, plant tissue and aquatic organism tissue samples.

Client Contact: Robert Blama, Baltimore District, 410-962-6068  
Robert Pruhs, Norfolk District, 757-201-7130

***Site Characterization, Remedial Design, and Habitat Restoration, and Remediation Oversight,  
Environmental Protection Agency, Great Lakes National Program Office, Chicago, Illinois***

EA has been awarded 18 task orders valued at over \$7.5M for work conducted on the Great Lakes Architect-Engineer Services (GLAES) contract in support of the Environmental Protection Agency's (EPA) Great Lakes National Program Office (GLNPO). EA provides technical and management services to EPA to support contaminated sediment evaluation, feasibility studies, remedial design activities, habitat restoration design and evaluation, geotechnical assessments, treatability studies, and contaminated sediment remedial oversight.

EA has performed site characterization activities, feasibility studies, and remedial design support at sites within the Muskegon Lake Area of Concern (Michigan), Maumee River Area of Concern (Ohio), Detroit River Area of Concern (Michigan), St. Louis River Area of Concern (Minnesota), Milwaukee Estuary Area of Concern (Wisconsin), Rouge River Area of Concern (Michigan), St. Clair River Area of Concern (Michigan), and the Grand Calumet Area of Concern (Illinois/Indiana). EA has collected more the 2,500 core samples in creeks, rivers, harbors, and estuaries for identification and delineation of contaminants of concern in surface waters, sediments, wetlands, pore water, and groundwater. Sampling techniques have included vibracoring, direct-push, and grab methods. Contaminants of concerns have included PAHs, PCBs, oil and grease, metals, and total petroleum hydrocarbons (TPH). In support of feasibility studies and remedial design, EA has performed bathymetric surveys, groundwater/surface water interactions and modeling, geotechnical assessments, and treatability studies (polymer and amendment testing). EA has also conducted aquatic and wetland habitat restoration design and permitting, and has provided public outreach support. Overall, EA has supported Federal and Non-Federal project sponsors in USEPA Region V at nine sites in six states. Under the GLNPO direction, EA has routinely: 1) Performed sediment, surface water, pore water, and stormwater sampling, 2) Coordinated a wide range of fixed laboratory analytical services, 3) Managed large data sets with complex data deliverable requirements, 4) Integrated information into usable conceptual site models, and 5) Maintained an excellent track record of producing high quality work products delivered on time.



Client Contact: Mike Dunneback, EPA Region 5 Contract Specialist, 312-886-7523

### **1.3 Project Team**

The project staff proposed for this project is entirely located in Hunt Valley, Maryland, and has experience conducting studies in Baltimore Harbor. Each person's role in the project, qualifications to fill that role, and hourly billing rate are summarized below. One-page resumes are included as Attachment 1.

**Project Manager—Frank Barranco, P.E., P.G., Ph.D.** Environmental Engineering Rate: \$214.90/hr  
Dr. Barranco managed the EA project team that interpreted field and historical data from the Coke Point Peninsula and wrote a site assessment report evaluating the nature and extent of onshore impacts and the potential migration of the contamination to offshore sediments. He also led coordination with USEPA and MDE to report findings of the site assessment, risk assessment and corrective measures study.

**Project Director/Senior Technical Review—Peggy Derrick, M.S.** Marine Science Rate: \$206.09/hr  
Ms. Derrick served as the project director and project manager for Coke Point investigations and risk assessments. She has implemented sediment investigations in the Chesapeake Bay and Baltimore Harbor for over 15 years. She will participate in project planning, execution, data evaluation, and reporting.

**Project Chemist—Dan Hinckley, Ph.D.** Marine Chemistry Rate: \$164.39/hr  
Dr. Hinckley has 31 years of experience in environmental chemistry, marine chemistry, analytical chemistry, physical chemistry, and human health and ecological risk assessment. He specializes in environmental characterization, and quality assurance/quality control issues.

**Field Lead—John Morris, B.S.** Marine Science Rate: \$128.76/hr  
Mr. Morris has 21 years of experience in marine environmental sampling, bathymetric surveys, and advanced geophysical surveys. He has managed the completion of over 40 task orders for the USACE, U.S. Coast Guard, U.S. Navy, and National Oceanographic and Atmospheric Administration (NOAA).

**Human Health Risk Assessor—Cynthia Cheatwood, B.S.** Civil Engineering Rate: \$126.90/hr  
Ms. Cheatwood performed the HHRA for the Coke Point offshore areas and presented results to agencies, stakeholders, and the public. She has 20 years of experience specializing in human health risk assessment and environmental site assessments, including fate and transport modeling and statistical analysis.

**Ecological Risk Assessor—Michael Ciarlo, M.S.** Environmental Science Rate: \$158.39/hr  
Mr. Ciarlo was responsible for the ecological risk assessment for the Coke Point offshore areas, and for over 30 other coastal sites in Maryland. He coordinates with regulators to address public health concerns, and presents risk assessment results to elected officials, community groups, the media, and stakeholders.

**Project Geologist—Samantha Saalfeld, Ph.D.** Earth Sciences Rate: \$96.44/hr  
Dr. Saalfeld assessed the transport processes affecting contaminants on and around Coke Point, assessed likely sources of offshore impacts, and constructed a hydrogeologic model to simulate groundwater flow on the Peninsula. She also prepared the Corrective Measures Study to identify remedial options.

**GIS Coordinator—Mark Dhruv, M.S.** Environmental Science Rate: \$135.36/hr  
Mr. Dhruv has 18 years of experience in Geographic Information Systems (GIS), and marine research, and has supported EA's work at Coke Point. He provides geo-spatial analysis/support including data analysis, geologic and hydrographic modeling, and presentation-quality figures.

**EVS/Statistics—Rebecca Murphy, Ph.D.** Environmental Engineering Rate: \$135.36/hr  
With 12 years of experience, Dr. Murphy has developed and implemented spatial statistical (kriging) techniques for interpolation of sediment and water quality and groundwater contamination data using the Environmental Visualization Software (EVS), and has analyzed sediment quality issues.

**Statistical Analysis/Modelling—Michael Powell, M.S.** Environmental Engineering Rate: \$135.36/hr  
Mr. Powell provided statistical analysis for the risk assessment for the Coke Point offshore area. He developed kriging models for human health and ecological risk in surface sediment and conducted a sensitivity analysis to evaluate the impact of alternative approaches to assessing risk in the study area.

#### **1.4 Analytical Laboratory**

**TestAmerica Laboratories, Inc.**, Beltway West Corporate Center, 5710 Executive Dr., Suite 106, Baltimore, MD 21228—TestAmerica will provide analytical laboratory services for chemical analysis of water, sediment, and tissue samples. EA has a standard subcontractor agreement with TestAmerica, and TestAmerica has analyzed samples for EA from dozens of coastal and estuarine water, sediment, and tissue projects over the past 13 years, totaling more than \$15 million. TestAmerica is recognized as the leading environmental testing firm in the United States. Operations include a nationwide network of 37 environmental testing laboratories and 29 service centers. Specialty analyses offered by TestAmerica include dredged material, source and ambient air, aquatic toxicity, explosives, specialty organics, dioxins, drinking water, sediments and tissues, emerging contaminants, radiochemistry, and mixed waste testing.

## 2.0 Project Management

Dr. Frank Barranco, the project manager, will be the main point of contact and responsible for ensuring that schedule, scope, budget, and communication with the Trust is maintained. The Project Manager will be responsible for schedule, cost, safety, and quality.

**Cost and Schedule Control**—The key to successful cost and schedule control is early detection of variances—while corrective action is still possible—through diligent tracking of costs incurred, costs committed, physical progress completed, and projections of cost at completion.

At the center of EA's management reporting process is our financial reporting software (BST 8.4). Labor effort is logged daily and input into electronic timesheets; expenses are input daily, including subcontractor invoices. Cost control is accomplished through proper upfront planning, regular monitoring of financial reports by the Project Manager, and follow-up action. The Project Manager is able to access financial information on a daily basis and is responsible for updating the project schedule, coordinating with the Trust, and planning resources needed to keep the project on schedule. EA has a successful track record of using Primavera, as well as MS Project.

**Documented Records**—EA has established procedures for documenting all project work through monthly progress reports and report/document submittals. These documents serve as a library of lessons learned for any additional personnel assigned to the project, or similar projects.

**Communications**—EA's project managers conduct regular project meetings, during which the project team discusses technical issues and progress. All team members are empowered to provide input, and any required changes to the project approach are discussed and implemented. We are consistently evaluating our technical approaches through the life cycle of a project, and we directly address project challenges.

**Quality Assurance/Quality Control**—EA's corporate Quality Assurance (QA)/Quality Control (QC) Program is designed to assure and properly document the validity, control, and proper tracking of project activities, deliverables, and decisions for all phases of work conducted under contract.

- **Work Plan Development**—QC procedures included in the work plan will include a defined set of sampling procedures, checks, calibrations, and metrics that can be measured against the Data Quality Objectives (DQOs). DQOs will be developed using the 7-step DQO process, with input from the Program Chemist, Dan Hinckley, Ph.D. The work plan will also address aspects of data collection that impact data quality.
- **Field Investigations**—Investigations, field studies, and reports will have input from, and be reviewed by Peggy Derrick, the project senior technical reviewer.
- **Chemical Analyses**—Dr. Hinckley will be responsible for ensuring that chemistry-related goals of the program, as presented in the work plan, are attained. He will monitor chemical QC aspects of work, procedures, and documentation; and will identify and provide solutions for chemical quality problems.
- **Data Maintenance and Storage**—Documents and data files are stored on the Local Area Network server. All files on that system are backed up daily, weekly, and monthly. These backups capture database files, documents, and user files.
- **Reports and Documents**—Each project deliverable will be reviewed by the senior technical reviewer for technical accuracy, completeness against the scope, methods, regulatory acceptance, and understandability. In addition, an editor will review each document for grammar, word consistency, spelling, and formatting.

**Safety and Health**—EA has an established Safety and Health (S&H) Program that meets the requirements of OSHA Standards 1910.120, 1926.65. We consider the personal S&H of our employees, subcontractors, clients, community residents, and visitors—as well as the prevention of work-related accidents, illnesses, and property loss—a critical priority.

### 3.0 Implementation Strategy

The RFP indicates the ultimate goal for completion of the Offshore Investigation, including risk assessment, is to provide background information to conduct an Offshore Corrective Measures Study at a later date, if needed. Seven tasks to address the Phase I area were specified in the RFP and are addressed in this proposal. A schedule was provided suggesting key milestones and an overall timeline. In this section, EA presents an approach for improving efficiencies in agency communication and document approval, as well as implementation of the field investigation.

**Agency Communications and Approvals**—EA has successfully used a combination of weekly conference calls and webinars to support review and acceptance of key documents for planning and project implementation. EA proposes a series of Technical Memoranda to highlight important technical issues for discussion and resolution of concerns. This approach facilitates agency approval during finalization of planning documents, data interpretation, and report preparation. These tools are particularly valuable in the early stages of this project to gain agency acceptance for the field work strategy discussed later in this section and to streamline the schedule.

**Subaqueous Survey**—A subaqueous survey (Task 2) will be conducted in Phase I, along with a visual shoreline survey. The visual survey will include collection of digital still photographs and geographic coordinates for noteworthy anthropogenic or natural features. The subaqueous survey will include a bathymetric survey, performed using a fathometer interfaced with a narrow-beam transducer, along lines oriented perpendicular to the shore at 50-foot intervals, and extending 200 feet into Bear Creek. A dual-frequency side scan sonar system will also be towed along four survey lines oriented parallel to the Phase I shoreline and spaced 40 ft apart, and single-beam bathymetry data will be collected concurrently with the sonar as a QA measure for the bathymetric survey data. Additional survey techniques could be implemented if desired, such as a land-water interface survey using a GPS receiver mounted on a survey rod to measure elevation at points above the waterline and in the intertidal zone, and use of a benthic sled to take underwater video for additional physical and biological characterization of the riverbed.

**Work Plan Development**—EA will review information from existing reports, including the locations of upland source areas, boring logs and lithology, topographic features, groundwater contamination, and groundwater potentiometric surface maps in the vicinity of Phase I and Phase II, under Task 1. This information will be used, along with data from the subaqueous survey of Phase I, in developing an initial Conceptual Site Model (CSM) for each Phase. The CSMs will include the upland source areas and any potential preferential flow pathways, and will help focus the sample collection activities and sequencing of work. The CSMs could be reviewed with agencies in an on-board review. EA will then use the CSMs to develop an investigation plan for Phase I and Phase II (Task 3) that focuses on evaluating potential contaminant contributions to the intertidal and near-shore areas, as described below for Phase I.

**Sampling, Analysis, and Work Sequence**—Evaluating the potential contaminant contributions from sediment deposits, stormwater discharges, and groundwater discharges is the main focus of the Offshore Investigation. Groundwater discharge zones may occur at the intertidal zone as well as in preferential flow pathways exiting the sediment bed from upland areas. Preferential groundwater flow pathways may exist in areas where slag fill was placed historically, such as north of Grey's Landfill and Humphrey's Impoundment. Contaminants in pore water may be indicative of potential groundwater discharge zones, as well as represent the bioavailable fraction of bulk sediment chemistry constituents. Because collection of pore water is challenging, it may be time- and cost-efficient to target collection and analysis of pore water in known affected areas only. EA, therefore, recommends developing a strategy to initially collect surface sediment samples for identification of locations containing Contaminants of Potential Concern (COPCs). Pore water samples and subsurface sediment samples would then be collected at locations with elevated COPC concentrations. Such a strategy could be implemented as Task 4a and Task 4b.



The existing ground surface elevations and groundwater potentiometric surface maps suggest that potential groundwater seeps may intersect the surface water at the tide line. Under Task 4a, EA will collect surface sediment samples from target locations in the intertidal zone and the immediate near-shore area up to a water depth of 5 feet. Stormwater sampling will also be performed as part of Task 4a sampling, which is estimated to occur over a one-month period, per the schedule presented in the RFP, if qualifying storm events occur. Surface water grab samples will be collected from the six active stormwater outfalls, during up to two storm events. A figure showing proposed surface sediment and stormwater locations (18 and 6 estimated samples, respectively) is provided in Attachment 2, with costing information. Once the analytical results for the sediments are reviewed, then a pore water and subsurface sediment sampling program (10 and 20 estimated samples, respectively) will be implemented in locations where Task 4a results indicate concentrations exceeding the marine sediment BTAGs or appropriate guidance thresholds. The actual number of pore water and sediment samples collected during Task 4b will be optimized based on evaluation of results from Task 4a. Use of technical memoranda and on-board reviews will be used to gain agency acceptance of the decision logic used to establish locations for sediment sampling, sequencing of sample collection, and subsequent collection of pore water.

The Task 4 investigation will be designed to minimize potential for additional data needs. However, there is a possibility that groundwater seeps may extend beyond the farthestmost sample sites of the initial Phase I (Task 4a) effort. If data and observations from the subaqueous survey and Task 4a indicate this possibility, additional sediment and pore water may be collected concurrently from new sample locations under Task 4b, and would only focus on COPCs that exceeded BTAG values from the inshore stations. If additional data gaps are identified after the completion of Task 4, based on the findings of the Data Gaps Report developed under Task 5, the additional Phase I Offshore Characterization specified in Task 6 may also target locations farther offshore. The schedule currently allows a 3-month timeline for data gap review and discussion (Task 5). The proposed step-wise approach may reduce this portion of the project (relative to performing all sampling under Task 4 at once) and reduce the number of data gaps to be addressed during additional Phase I sampling (Task 5), if necessary.

**Report**—A Phase 1 Offshore Investigation Report (Task 7) will be prepared that includes the results of the ecological and human health risk assessments performed under Task 5. Once the risk assessments are complete, an on-board review would be scheduled with the agencies to discuss the outcome and gain acceptance for the conclusions. In consultation with MDE and USEPA, EA developed the *Final Risk Assessment of Offshore Areas Adjacent to the Proposed Coke Point Dredged Material Containment Facility at Sparrows Point* (Coke Point RA). This risk assessment addressed benthic, aquatic, mammalian, and avian receptors, and human recreational receptors (via swimming and ingestion of fish and crabs). The spreadsheet and modeling software from this assessment, incorporating the agency-approved exposure parameters, benchmarks, and BSAFs, will be used to evaluate the Trust's Phase I data. While a review to incorporate any agency-generated updates will be conducted, use of the existing framework will result in efficiencies in risk assessment design, execution, and agency approval.

Potential surface water impacts will be assessed by developing a tidally-dynamic model (Surface Water Modeling System [SMS]) to examine the mixing of the constituent mass flux of groundwater and stormwater. Results of stormwater sampling will be statistically analyzed in order to determine representative discharge concentrations. Model inputs also will include mass flux from groundwater along the Bear Creek shoreline, and surface water contributions from Bear Creek and the Patapsco River. The model will simulate sediment deposition and erosion using the rates developed for Bear Creek as part of the Comprehensive Harbor Assessment and Regional Model (CHARM) Study (1996-2000). Conclusions of the report will address impacts of stormwater runoff and groundwater seeps and provide recommendations for additional investigations of the Northwest Shoreline, if necessary. Lastly, the report may also provide recommendations for an Offshore Corrective Measures Study, if warranted.

**Attachment 1**

**Resumes for Project Staff**

## Frank T. Barranco, Ph.D., P.E., P.G. Technical Chief Geologist

Dr. Barranco is a 25-year veteran of the consulting business. He plays an active role in the Quality Management Program as the Director of Quality Control and, as such, authors and implements EA's quality control policies and procedures. Dr. Barranco's specific area of technical expertise relates to the occurrence, fate, persistence, and cleanup of subsurface hydrocarbons in hydrogeologic settings. Dr. Barranco has worked with private industry, federal, and municipal clientele throughout the United States over the past 20 years.

***Sparrows Point Resource Conservation and Recovery Act Site Assessment; Baltimore Harbor, Maryland; Maryland Environmental Service***—Managed project team that conducted Resource Conservation and Recovery Act-related due diligence activities, site assessments, risk assessments, corrective measure study, and conceptual design for addressing legacy contaminants on the Coke Point Peninsula. Team collected and interpreted field and historical onshore and offshore soil, groundwater, NAPL, surface water, and sediment data. Designed real-time field screening techniques and a field-flexible work plan to meet project schedules, save on cost (by an estimated \$300,000), and collect just the right amount of data necessary for site assessment in a timely manner. Utilized environmental forensics analyses to chemically fingerprint the industrial source of environmental impacts observed for offshore sediments. Oversaw modeling to assess possible groundwater/surface water interactions. Prepared comprehensive site assessment report evaluating the nature and extent of legacy impacts to onshore and offshore environments. Developed project work plans and field sampling plans; assembled site assessment report; prepared human health and ecological risk assessment; prepared corrective measures study, and performed conceptual design of remedial measures that seamlessly dovetailed with site future use as a dredged material containment facility. Presented at public outreach meetings relating to the RCRA site assessment findings and concept-level response measures that would be employed with construction of the dredged material containment facility. Coordinated with EPA and Maryland Department of the Environment to report site assessment findings and preliminary results of ongoing risk assessment and corrective measures study. As testament to the quality and technical accuracy of products, U.S. Environmental Protection Agency is allowing the owners to use EA site assessment data for their ongoing RCRA compliance.

***Westport Redevelopment, Inner Harbor West Redevelopment LLC, Baltimore City, Maryland; Project Management and Senior Technical Review***—Investigation and Remediation of waterfront Brownfields site located on the Middle Branch of the Patapsco River. Work includes preparation of the investigation Work Plans, Phase II Environmental Site Assessments, Human Health Risk Review, Response Action Plan, and construction oversight. EA assisted in obtaining funding with Chesapeake Bay Trust and American Reinvestment and Recovery Act.

***Innovative Reuse Committee Support, Cox Creek Dredged Material Containment Facility, Baltimore County, Maryland; Maryland Environmental Service***—Project Manager serving on the Innovative Reuse Evaluation Committee reviewing concept/full proposals on demonstration- and full-scale treatment and innovative reuse of dredged material from the Baltimore Harbor.

### Qualifications

#### Education

Ph.D.; Colorado School of Mines;  
Environmental Science and Engineering;  
1998  
M.S.; University of Texas Arlington; Geology;  
1988  
B.S.; Duke University; Geology; 1984

#### Registration/Certifications

Registered Professional Engineer—MD (No.  
43120)  
Registered Professional Geologist—TN (No.  
005603)

#### Specialized Training and Experience

OSHA Hazardous Waste Operations and  
Emergency Response Site Worker  
OSHA 40-Hour Hazardous Waste Operations  
Training and 8-Hour Annual Refresher  
CPR and First Aid Training  
ASTM E50 Committee Member (Green and  
Sustainable Remediation)  
Sustainable Remediation Forum Member  
Scientific Advisory Board, AEHS Foundation  
Annual Conference  
Society of Military Engineers Student  
Mentoring Program  
Johns Hopkins University Instructor for  
Environmental Program for Professionals

#### Experience

Years with EA: 18                      Total Years: 25

## **Peggy A. Derrick**

### **Senior Scientist/ Senior Project Manager**

Ms. Derrick is a Senior Scientist and Senior Project Manager with 22 years of experience conducting environmental assessments and evaluations. She manages sediment, water, and biological monitoring and testing programs; analyzes ecological data; and writes and reviews technical documents. Her areas of expertise include sediment characterization and dredged material placement studies; sediment remediation; estuarine and marine ecology; impact analysis; and design, coordination, and implementation of aquatic resource studies.

In addition to her technical responsibilities, Ms. Derrick serves as a senior project manager and as a program manager for environmental contracts for Maryland Environmental Service and the Maryland Port Administration (MPA). Ms. Derrick also serves as Chief Scientist for a Great Lakes National Program Office/Great Lakes Legacy Act sediment remediation/restoration contract with the U.S. Environmental Protection Agency (EPA) Region 5.

***Sparrows Point Dredged Material Containment Facility: Environmental Investigations, Planning, Technical, and Design Support, and Risk Assessment, Baltimore, Maryland; Maryland Environmental Service; Project Director/Project Manager***—Serves as

Project Director for environmental support for the MPA's proposed DMCF at Sparrows Point, including onsite and offsite investigations, and as Project Manager for the human health and ecological risk assessment of the offshore area in the vicinity of Coke Point/Sparrows Point. Tasks include preparation of work plans and reports; public outreach support; and regulatory agency coordination.

***Lower Maumee River Sediment Characterization Study, Toledo, Ohio; EPA Region 5, Great Lakes National Program Office; Principal Scientist***—Serving as Principal Scientist for assessment of contaminated sediments in the Lower Maumee River near the confluence with Maumee Bay and Lake Erie. Contaminants of concern include polychlorinated biphenyls, polycyclic aromatic hydrocarbons, and heavy metals. Sampling included collection of sediment cores (varying in length from 2 to 15 ft) from more than 70 locations for depth interval analysis of physical and chemical constituents. Results will be used to: (1) define the nature and extent of chemical contamination in the areas of soft sediment deposition, (2) develop preliminary estimates for the volume of soft sediment in these areas; (3) identify hotspots; and (4) identify potential sources of contamination.

***Evaluation of Dredged Material: Federal Navigation Channels in Baltimore Harbor and Chesapeake Bay, Maryland and Virginia; USACE–Baltimore District; Project Manager***—Managed sediment characterization studies (FY95, FY98, FY02, FY05, FY08 and FY11) for 19 federally-maintained navigation channel segments in Baltimore Harbor, Upper Chesapeake Bay, Maryland and Lower Chesapeake Bay, Virginia. Designed and implemented sampling programs, analytical testing, and ecotoxicological testing related to upland placement, restoration initiatives, and ocean placement of dredged material. FY08 assessment included development of statistical evaluation protocols for comparing sediment quality in various channels, determining acceptability of sediment for various placement options, and maximizing the sampling program design.

### **Qualifications**

#### **Education**

M.S.; University of Maryland; Marine Estuarine Environmental Science; College Park, MD; 1994  
B.A.; Goucher College; Biology; Towson, MD; 1991

#### **Registrations/Certifications**

Transportation Worker Identification Credential

#### **Specialized Training**

Wharton Executive Education Program – Essentials of Management  
The Dale Carnegie Course  
EA Project Manager Training  
OSHA 40-Hour Hazardous Materials Site Worker Training Course  
OSHA 8-Hour Hazardous Waste Site Worker Refresher Courses  
CPR and First Aid Training

#### **Professional Affiliations/Appointments**

Coastal and Estuarine Research Federation – Member; 1998 – Present  
Atlantic Estuarine Research Society (AERS) – Member; 1992 – Present  
Society of Environmental Toxicology and Chemistry – Member; 2000 – Present  
Society of American Military Engineers – Member; 2002 – Present  
National Association of Environmental Professionals – Member; 2006 – Present  
Sediment Management Work Group

#### **Experience**

Years with EA: 18

Total Years: 22



## Daniel A. Hinckley, Ph.D.

### Senior Scientist

Dr. Hinckley has 31 years of experience in environmental chemistry, marine chemistry, analytical chemistry, physical chemistry, human health and ecological risk assessment, environmental assessment, and project management. He is serving as Program Chemist for the EPA Remedial Action Contract Regions 3 and 6 and Region 5 Great Lakes Architect-Engineer Services contracts as well as the Operational Range Assessment Program and Military Munitions Response Program. In this role, he has assisted in Quality Assurance Project Plan preparation including EPA QAR-5 and EPA Uniform Federal Policy Quality Assurance Project Plan formats, sample designs, analytical method selection, interactions with laboratories, data validators, and data managers, and responding to and discussing project chemical issues with stakeholders.

***Great Lakes National Program Office/Great Lakes Legacy Act, EPA Region 5; Program Chemist***—Serves as program chemist for projects under the Great Lakes Legacy Act, assisting in sample design, performing senior technical reviews of Quality Assurance Project Plans, and assisting with data interpretation and data quality issues.

***Remedial Action Contract 2; EPA Region 3; Program Chemist***—Serves as program chemist for this 10-year program that includes all aspects of EPA Region 3 responsibilities. This includes site investigations, remedial investigations, remedial action monitoring, and long-term monitoring. As program chemist, interacts with the regional EPA laboratory to assure that quality assurance/quality control procedures are being complied with and that any problems are dealt with appropriately. In addition, assists in the preparation of and reviews project Quality Assurance Project Plans. To date has been associated with twelve individual EPA Region 3 projects, including technical reviews, Quality Assurance Project Plan reviews, and various chemical data interpretation issues.

***Remedial Investigation and Quality Assurance Project Plans/Safety, Health and Emergency Response Plans, and Remedial Investigation; Allen Harbor Sediment Study; Project Chemist***—Served as task manager, risk assessor, and project chemist for a Quality Assurance Project Plan, Sampling and Analysis Plan, and remedial investigation to study sediment in Allen Harbor, Rhode Island. The sediment had been contaminated with fuel oil sourced to the Navy. In addition, environmental forensics were used to determine the source of contaminants in the harbor sediment.

***Polychlorinated Biphenyl Total Maximum Daily Load Evaluation at Various Constellation Energy Power Plants; Project Chemist***—Served as project chemist and data assessor for the analysis of polychlorinated biphenyls in sources and discharges from three combustion power plants owned by Constellation Energy, to support MDE in development of a total maximum daily load for polychlorinated biphenyls in Baltimore Harbor.

***Ecological Risk Assessment, Knolls Atomic Power Laboratory Site SIC; Knolls Atomic Power Laboratory; Eileen Mahoney Associates; Project Manager/Ecological Risk Assessor***—The Knolls Atomic Power Laboratory S1C site, located in Windsor Connecticut, was the site of a testing a Naval nuclear reactor. Based on the ecological risk assessment, it was found that there was little likelihood that ecological receptors at the site or in Goodwin Pond were at risk.

### Qualifications

#### Education

Ph.D.; University of South Carolina; Columbia, SC; Marine Chemistry, Chemical Oceanography; 1989  
M.S.; Wright State University; Dayton, OH; Environmental Chemistry, Physical Chemistry; 1985  
B.S.; Wright State University; Chemistry; Dayton, OH, 1983

#### Specialized Training

Department of Defense Environmental Monitoring and Data Quality Workshop; 2009-2010  
EA Project Management Training; 1993, 2005  
Expert Witness Workshop; 1994

#### Professional Affiliations/Appointments

American Chemical Society; 1984–2010  
Society of Environmental Toxicology and Chemistry; 1987–2010

#### Experience

Years with EA: 22                      Total Years: 30

## John T. Morris

### Senior Marine Scientist

Mr. Morris is a Senior Marine Scientist and Project Manager offering EA clients over 21 years of experience in marine environmental sampling, oceanographic instrument deployment, and advanced geophysical surveys. For the past 14 years, he has served in a project and program management capacity requiring oversight of major field programs for agencies including the U.S. Coast Guard, U.S. Navy, and National Oceanic and Atmospheric Administration. His multi-disciplinary experience includes involvement in wide array of shallow water, coastal, and deep ocean projects, including comprehensive physical, chemical, and biological investigations and benthic habitat assessments.

#### Qualifications

##### Education

B.S.; Richard Stockton College of New Jersey; Pomona, NJ; Marine Sciences Coastal Resource Management; 1990

##### Specialized Training

EA Project Manager Training; 2012  
CPR and First Aid Training; 2001-2012  
OSHA 40-Hour Hazardous Materials Site Worker Course; 2012  
OSHA 30-Hour Construction Supervisor Course; 2012  
Confined Space Operations Training; 2012  
SCUBA Certification; Open Water Diver; 1984

##### Experience

Years with EA: 2

Total Years: 21

#### ***Maryland Port Administration – Lightweight***

***Aggregates, Baltimore, Maryland; Gahagan and Bryant Associates; Senior Field Scientist***—Performed the July 2012 field sampling of sediments at multiple locations within the Patapsco River as part of a project sponsored by the Maryland Port Administration to evaluate innovative techniques in the re-use of maintenance dredged material. The sediments were collected using various types of sediment coring techniques, composited, and preserved geotechnical analyses. Roles and responsibilities for this project included project management, oversight of project logistics and field safety, and survey vessel operations.

#### ***Baltimore Inner Harbor Dredged Material Characterization, Baltimore, Maryland; Gahagan and Bryant***

***Associates; Senior Field Scientist***—Performed the January 2012 field sampling of sediments at multiple locations within Baltimore Harbor to facilitate the physical and chemical characterization of the material that will be removed via clamshell dredging in Spring 2012. The sediments were considered maintenance material to be dredged in preparation for the on-water activities associated with the Bicentennial celebration of the War of 1812 in Baltimore Harbor, including the parade and mooring of several Tall Ships. Roles and responsibilities for this project included oversight of project logistics and field safety, survey vessel operations, and subcontractor coordination.

#### ***Poplar Island 2013 Exterior Geotechnical Monitoring, Chesapeake Bay, Maryland; Maryland Environmental***

***Service; Senior Field Scientist***—Conducted the April 2013 field sampling effort associated with long-term monitoring of surface sediment composition surrounding the Poplar Island/Paul S. Sarbanes Restoration Site. Duties performed included overseeing project logistics, survey vessel operations, and subcontractor coordination.

#### ***Lower Darby Creek/Folcroft Landfill Site Assessment, Philadelphia, Pennsylvania; U.S. Environmental***

***Protection Agency Region 3; Senior Scientist***—Conducted a hydrographic survey of the Lower Darby Creek and its confluence with the Delaware River to evaluate the accumulation of fine-grained, estuarine sediments in various reaches of the water body. Single beam bathymetry was employed to collect seafloor topography data and high-resolution subbottom profiling was used to interrogate the top 5 meters of the seabed in order to measure the thickness of soft sediment deposits. Fine-grained sediment deposits in excess of 0.5 m were identified using the remote sensors and targeted for sampling to complete detailed chemical characterization of the sediment column in near and far-field locations associated with the former Folcroft Landfill.

#### ***Cove Point Temporary Laydown Area 1 Hydrographic Assessment, Patuxent River, Maryland; Dominion***

***Resources; Task Manager***—Performed a multi-phase underwater site characterization project consisting of a hydrographic survey including a precision single-beam bathymetry survey using Real-Time Kinematic Global Navigation Satellite System (GNSS) methods for precision positioning in the horizontal and vertical planes.

## Cynthia L. Cheatwood

### Human Health Risk Assessor

Ms. Cheatwood is an environmental engineer with 20 years of experience who specializes in human health risk assessment and environmental site assessments. Her duties have included project management, fate and transport modeling, toxicology, statistical analysis, and remedial design.

Ms. Cheatwood is familiar with standard human health risk assessment practice and has successfully completed assessments under various regulatory frameworks, including federal, state, and local agencies. She has performed and overseen all aspects of a risk assessment, from maintaining databases of chemical data to using exposure models.

Ms. Cheatwood has applied Geographic Information Systems and specialized chemical analyses to produce more realistic risk assessment results that are immediately relevant to risk management. She also has extensive experience in risk communications, having presented to a broad range of audiences and audiences in high risk, low trust situations.

***Risk Assessment of Coke Point Offshore Environments, Sparrows Point, Maryland; Maryland Environmental Services for the Maryland Port Administration; Senior Risk Assessor***—Performed Human Health Risk Assessment for offshore areas around the Coke Point Peninsula at Sparrows Point. Evaluated potential impacts to offshore surface water, sediment, fish, and crab tissue. The risk assessment evaluated separate human exposure scenarios based upon expected re-use of the property. In addition, the risk assessment evaluated fish and crab tissue samples, and the determination of chemical concentrations in fish and crabs using biouptake factors. Determined which areas of the offshore contribute significantly to Human Health Risk Assessment results to determine where the greatest risk reduction might occur with remedial action. Completed a sensitivity analysis of the risk assessment that evaluated various input parameters including exposure, background evaluations, and toxicity. Also participated in 12 public information sessions that involved presenting the results of the risk assessment to elected officials, public interest groups, community group leaders, local press, and the general public.

***Masonville Environmental Education Center, Baltimore, Maryland; Maryland Port Administration; Environmental Engineer***—Evaluated an undeveloped site for beneficial re-use as an environmental center/recreational area. The site was subject to unauthorized dumping by various parties over decades. Contaminants of concern included arsenic, lead, and polycyclic aromatic hydrocarbons. Determined site-specific cleanup goals based upon the future use of the site to allow for a focused remediation. Also analyzed potential fill material from other Maryland Port Administration sites for beneficial re-use at the Masonville site. The use of a focused remediation and re-use of fill material allowed for cost savings in the site cleanup. Participated in public meetings and presentation of risk assessment results and implications to community and project stakeholders. Also completed a Remedial Action Plan and determined appropriate remedial measures for staged cleanup of the site. Presently, evaluating fill material sources to be used as cover material for the recreational area. Evaluations requires a risk evaluation to ensure that chemicals within the fill material will not be a concern for children using the area.

***St. Helena Park, Dundalk, Maryland; Baltimore County, Maryland; Human Health Risk Assessor***—Baltimore County, Maryland had plans to redevelop St. Helena Park. However, concerns were raised about potential chromium contamination and the presence of a historical landfill at the park. Performed an environmental site assessment to determine if chromium or other metal contamination existed at the park and whether a landfill was located in area of park redevelopment. The human health risk assessment evaluated soil, surface water, and sediment samples and revealed a slightly increased risk for receptors exposed to the park. As a result, analyzed the risk assessment and sampling data to determine if a small area of the park contributed disproportionately to potential risks to future users, and if the remainder of the park could be redeveloped.

#### Qualifications

##### Education

B.S.; University of Maryland; Civil Engineering; 1993  
M.S. Public Health candidate; Johns Hopkins University; expected 2015

##### Specialized Training

EA Project Manager Training; 2007  
OSHA 8-Hour Hazardous Waste Operations Supervisor Training; 1996  
OSHA 40-Hour Hazardous Waste Operations Safety Training; 1993  
Confined Space Entry Training  
CPR and First Aid Training

##### Experience

Years with EA: 13

Total Years: 20

## Michael C. Ciarlo

### Risk Assessor/Project Manager

Mr. Ciarlo has 18 years of experience in the fields of risk assessment, remediation, environmental assessment, and environmental science. As a project manager, he has led successful investigation, assessment, and remediation of complex sites.

As lead risk assessor, Mr. Ciarlo is familiar with standard ecological risk assessment practice and has successfully completed assessments under various regulatory frameworks. He has extensive experience in planning and conducting field surveys, and has specific expertise in sediment investigation and remediation efforts. He has performed and overseen all aspects of ecological risk assessment, from maintaining databases of chemical and biological data to using wildlife exposure models and developing benchmarks. Mr. Ciarlo has applied Geographic Information Systems and specialized chemical analyses to produce more realistic risk assessment results that are immediately relevant to risk management. He also has extensive experience in risk communications, having presented to a broad range of audiences and audiences in high risk, low trust situations.

***Risk Assessment of Coke Point Offshore Environments, Sparrows Point, Maryland; Maryland Environmental Service; Risk Assessment Task Manager***—Task Manager responsible for oversight of a high profile ecological risk assessment and human health risk assessment of sediments in a heavily

contaminated urban estuary. Conducted an ecological risk assessment for wildlife and important fisheries. Planned and oversaw collection of fish and crab tissue as well as laboratory bioaccumulation tests. Performed extensive coordination with regulators to address public health and risk communication concerns, and presented risk assessment results to elected officials, community groups, the media, and stakeholders.

***Dredged Material/Sediment Evaluation for Beneficial Use at the Poplar Island Environmental Restoration Project, Chesapeake Bay, Maryland; U.S. Army Corps of Engineers-Baltimore District; Ecological Risk Assessor***—Completed work plans, literature research, field sampling, exposure and toxicity modeling, and production of a beneficial use sediment evaluation report for sediments/dredged material planned for placement at the Poplar Island Environmental Restoration Project. Planned and conducted sampling of dried and wet material from Poplar Island Environmental Restoration Project habitat cells. Conducted exposure and toxicity modeling for plants, aquatic organisms, and wildlife. Provided specific management and monitoring conclusions for incorporation into adaptive management, and presented methods and results to stakeholders.

***Lincoln Park Phase 2 Feasibility Study and Remedial Design, Milwaukee, Wisconsin; U.S. Environmental Protection Agency Region 5 Great Lakes National Program Office; Project Manager***—Led field investigation, feasibility study, and public outreach for remediation of over 20,000 cubic yards of material contaminated with polychlorinated biphenyls, polycyclic aromatic hydrocarbons, and fuel oil non-aqueous phase liquid in the Milwaukee River. Performed bathymetric surveys, sediment coring to determine nature and extent, specialized surveys for non-aqueous phase liquid, geotechnical characterization to support design, and habitat and wetland surveys to support restoration.

### Qualifications

#### Education

M. S.; Johns Hopkins University; Environmental Science; 2000

B.S.; Duke University; Biology; 1995

#### Specialized Training

EA Project Manager Training; 2004

OSHA 8-Hour Hazardous Waste Operations Refresher; 2007

OSHA 8-Hour Hazardous Waste Operations Supervisor Training; 1999

OSHA 40-Hour Hazardous Waste Operations U.S. Coast Guard and Maryland Department of Natural Resources approved basic boating course; 1999  
ArcView Geographic Information System Short Course; 1998

U.S. Army Corps of Engineers Approved Wetlands Delineation Course; 1996

Department of Defense Risk Communication Course; 1996

CPR and First Aid Training; 2007

#### Professional Affiliations/Appointments

Adjunct Professor, Johns Hopkins University Krieger School of Arts and Sciences; 2010 – Present

Member of Ecological Risk Assessment Advisory Group; 2006 – Present

Society of Environmental Toxicology and Chemistry, Member; 1998 – Present

Society for Risk Analysis, Member; 2008 – Present

#### Experience

Years with EA: 10

Total Years: 18



## **Samantha L. Saalfeld, Ph.D.** **Geologist**

Dr. Saalfeld works in the Site Characterization and Remediation group at EA, and specializes in the behavior of inorganic contaminants in surface and groundwater. Her Ph.D. dissertation addressed arsenic contamination in groundwater. She also has experience with data quality planning and analysis, assessments of remedial alternatives, and geochemical and hydrogeological modeling.

***Sparrows Point Dredged Material Containment Facility; Baltimore Harbor, Maryland; Maryland Environmental Service; Scientist***—Constructed a hydrogeologic model, using Groundwater Modeling System software, to simulate groundwater flow on Coke Point. Provided a summary of the fate and transport processes dictating behavior of inorganic as well as organic contaminants. Used environmental forensics data, mass flux calculations, and adsorption modeling to determine likely sources of offshore impacts, including possible groundwater/surface water interactions. Assisted in the preparation of the Site Assessment Report and Additional Offshore Delineation Report, as well as the Corrective Measures Study. Wrote summary documents for use by the public, regulators, and property negotiators.

***Phase I Investigation and Conceptual Site Model; Manistique River Area of Concern, Manistique, Michigan; National Oceanographic and Atmospheric Administration; Scientist***—Prepared a Quality Assurance Project Plan addendum for sediment sampling to be conducted in the Manistique River Area of Concern and analyzed for polychlorinated biphenyls. Utilized the results, in combination with previously collected data, in preparing a detailed conceptual site model for the site. The conceptual site model incorporated the following site features and processes: historical and potentially ongoing sources onshore; possible transfer of polychlorinated biphenyls between soil, groundwater, sediment, and surface water; and sediment mixing and transport patterns as interpreted based on geochemical and bathymetric data as well as hydrodynamic modeling.

***Surficial Porewater and Sediment Analysis, Spirit Lake Contaminated Sediment Site; St. Louis River Area of Concern, Duluth, Minnesota; U.S. Environmental Protection Agency, Region 5; Great Lakes Architect-Engineer Services; Scientist***—Assessed partitioning of metals and polycyclic aromatic hydrocarbons (PAHs) between surficial sediments and porewater. Evaluated the potential for risk associated with contaminants in porewater by screening contaminant concentrations against surface water quality criteria, and screened concentrations in sediment against Minnesota sediment quality targets, intended to protect sediment-dwelling organisms. Screening indicated that the sediment concentrations exceeded risk criteria more often than the porewater concentrations. By comparing the observed porewater concentrations to the concentrations in porewater expected based on partitioning from sediment, determined that PAHs were more strongly bound to sediments at the site than expected based on published partitioning coefficients. This conclusion was used in assessing cleanup goals for the site.

***Feasibility Study/Remedial Design for the Lincoln Park/Milwaukee River Channel Sediments Site; Milwaukee Estuary Area of Concern, Glendale, Wisconsin; U.S. Environmental Protection Agency, Region 5; Great Lakes Architect-Engineer Services; Task Manager***—Lead author and task manager for a feasibility study assessing options for remediation of sediments contaminated with polychlorinated biphenyls in the Milwaukee River. Also prepared a Quality Assurance Project Plan for sediment sampling to support the feasibility study, and developed detailed rationale for sampling and analytical design in consultation with chemists from the U.S. Environmental Protection Agency and Wisconsin Department of Natural Resources. Prepared materials summarizing the findings of the feasibility study for a public information session.

### **Qualifications**

#### **Education**

Ph.D.; Dartmouth College; Earth Sciences; 2009  
B.A.; Whitman College; Geology-Chemistry;  
2004

#### **Specialized Training**

OSHA 40-Hour Hazardous Waste Site Worker Training; 2009  
OSHA 8-Hour HAZWOPER Refresher, 2012  
INNOV-X Systems Radiation Safety and Operations Training for Field XRF analyzers  
Interstate Technology and Regulatory Council's Incremental Sampling Methodology Training  
Department of Defense Quality Systems Manual v.5 Training  
EA Project Manager Training, 2013  
CPR and First Aid Training; 2012

#### **Experience**

Years with EA: 4                      Total Years: 9

## **Mark I. Dhruv, GISP** **GIS Coordinator/Scientist**

Mr. Dhruv has 18 years of professional experience in Geographic Information Systems (GIS), environmental management, and marine research. As GIS Coordinator, Mr. Dhruv provides geo-spatial analysis/support which includes data analysis, geologic and hydrographic modeling, preparing presentation quality figures, and writing technical documents related to GIS projects. Prior to his duties as a GIS Coordinator, Mr. Dhruv conducted scientific research for 5 years as a marine fisheries/wildlife biologist. He has also investigated water quality impacts through surface water collections for the U.S. military and for National Pollutant Discharge Elimination System compliance requirements at commercial airports.

***Ryerson Creek Outfall Area of Concern Site Characterization; Muskegon Lake Area of Concern, Muskegon, Michigan; U.S. Environmental Protection Agency Region 5; Geographic Information System Manager***—Provided GIS analysis and report figure

support to delineate the extent and nature of contamination at the Ryerson Creek Outfall Area of Concern. Analysis duties consisted of modeling plume volumes based on chemical results of soil borings. Utilized C-Tech's Environmental Visualization Systems software to interpolate 3-D results.

***Phase II Lower Maumee River Site Characterization; Toledo, Ohio; U.S. Environmental Protection Agency Region 5; Geographic Information System Manager***—Assisted with delineation of the nature and extent of sediment contamination associated with historical and current industrial land in the lower Maumee River. Participated in the field effort where 90 cores and over 300 samples were collected and processed. Provided GIS analysis and report figure support to delineate the extent and nature of contamination at the Area of Concern. Analysis duties consisted of modeling plume volumes based on chemical results of soil borings. Utilized C-Tech's Environmental Visualization Systems software to interpolate 3-D results.

***Sparrows Point Dredged Material Containment Facility; Baltimore Harbor, Maryland; Maryland Environmental Service; Geographic Information System Manager***—Coordinated GIS applications associated with onshore and offshore investigations on the Coke Point Peninsula. Determined efficiencies to seamlessly process the data stream from data management through reporting.

***Westport Development Site, Baltimore, Maryland; Westport LLC; GIS/Hydraulic Modeling Support***—Project involved the redevelopment of a West Baltimore Industrial facility. Was tasked with assisting in the hydraulic modeling of the proposed grading of the site. This required the use of the U.S. Army Corps of Engineers HEC-RAS hydraulic modeling software as an extension in ArcGIS. Also prepared figures illustrating the results of the modeling for reporting purposes.

***Lower Darby Folcroft Remedial Investigation/Feasibility Study, Philadelphia; U.S. Environmental Protection Agency Region 3; GIS Support***—As part of the remedial investigation at Operable Unit – Folcroft Landfill, GIS project support included the analysis of the site to determine the location of decision units, bathymetry modeling, and the geo-spatial analysis of sample collection data results. Additional support involved the development of field maps and report figures.

### **Qualifications**

#### **Education**

M.S.; Johns Hopkins University; Environmental Science and Policy; 2006  
B.S.; Texas A&M University at Galveston; Marine Biology; 1994

#### **Specialized Training**

Certified Geographic Information Systems Professional (GISP); 2011  
EA Project Manager Training; 2010  
OSHA 40-Hour Hazardous Waste Operations Safety Training; 2006  
OSHA Hazardous Waste Operations 8-Hour Refresher  
OSHA Hazardous Waste Operations Supervisor Training  
OSHA 30-Hour Training-Construction  
Confined Space Entry Supervisor Training  
CPR and First Aid Training

#### **Experience**

Years with EA: 5                      Total Years: 18

## Rebecca R. Murphy, Ph.D. Engineer

Dr. Murphy has 11 years of experience applying a combination of technical tools to environmental projects. She has expertise in data analysis using spatial tools such as geostatistics and Geographic Information Systems. She develops and implements database and modeling tools for environmental projects. She has also been involved in multi-media fate and transport model development and testing for human and ecological health risk assessments. Dr. Murphy's doctoral dissertation research involved evaluating long-term trends in hypoxia in Chesapeake Bay by relating trends in water quality to nutrient loads, climate, and hydrodynamic forces.

### Qualifications

#### Education

Ph.D.; Johns Hopkins University; Geography and Environmental Engineering; 2012  
M.E.; Cornell University; Agricultural and Biological Engineering; 2002  
B.S.; Cornell University; Agricultural and Biological Engineering; 2001

#### Professional Affiliations/Appointments

Coastal and Estuarine Research Federation

#### Experience

Years with EA: 1                      Total Years: 11

***Lincoln Park, Feasibility Study, Milwaukee, Wisconsin; U.S. Environmental Protection Agency Region 5; Modeler***—For this contaminated sediment project in the Milwaukee River, built a three-dimensional model of polychlorinated biphenyl, polycyclic aromatic hydrocarbon, and non-aqueous phase liquid contamination using kriging in C-Tech's Environmental Visualization Systems (EVS) software. Used the model results to generate estimated volumes of impacted sediments and figures showing the extent of contamination.

***Hidden Lane Landfill, Sterling, Virginia; U.S. Environmental Protection Agency Region 3; Modeler***—EA performed remedial investigation activities at this groundwater contaminated site and prepared a conceptual site model to understand the geological features, groundwater flow patterns in fracture bedrock, and extent of trichloroethylene plume. Responsibilities involved developing a three-dimensional plume model for trichloroethylene at the site using the EVS software for both visualization purposes and to inform the conceptual site model. Model development involved working closely with project geologists to build an appropriate model that took into account subsurface geology. Presented the EVS model with images in 3-dimensions, exploded layers in the subsurface, and movies demonstrating the subsurface fracture structure, the observed trichloroethylene concentrations, and the model results that link the two in order to estimate the extent of current contamination.

***Platte River Recovery Implementation Program - Water Quality Monitoring and Data Analysis; Nebraska Community Foundation; Statistician***—This project has involved identifying baseline water quality conditions using 3 years of monitoring data on the Platte River and evaluating potential impacts of program actions to address endangered species issues in the central and lower Platte River Basin. Tasks included compiling a Microsoft Access database of 4 years of continuous monitoring data on flow and water quality collected by EA, constructing graphs to visualize long-term trends in water quality, and performing statistical analysis to identify baseline conditions and whether turbidity or any other water quality indicator was altered significantly by program actions including island building and sediment removal.

***Ocean Placement Evaluation, Upper Chesapeake Bay Approach Channels to the Port of Baltimore, Maryland; U.S. Army Corps of Engineers—Baltimore district; Modeler***—For dredged material evaluation to assess the feasibility of ocean placement of dredged material from the Upper Chesapeake Bay Approach Channels to the Port of Baltimore, performed STFATE modeling of placement events, and assessment of data in relation to compliance with Section 103 of the Marine Protection Research and Sanctuaries Act.

***Evaluation of Dredged Material in Pensacola Harbor, Pensacola, Florida; U.S. Army Corps of Engineers—Mobile District; Modeler***—For proposed dredging projects in both Pensacola Harbor and Norfolk Approach Channels, conducted STFATE sediment fate and transport modeling for both Tier II and Tier III evaluations in compliance with Section 103 of the Marine Protection Research and Sanctuaries Act. These efforts have involved working with sediment core data and toxicity results to evaluate the potential dredged material, identifying disposal site characteristics, model set up, and evaluation of disposal options.

## **Michael W. Powell**

### **Senior Scientist**

Mr. Powell is an environmental scientist with 19 years of experience in managing and conducting water quality studies, statistical analysis of environmental data, and chemical fate and transport modeling. He has developed stormwater models for urban watersheds using Stormwater Management Model (SWMM) and has developed hydrodynamic and water quality models using HEC-RAS, QUAL2E, Water Quality Simulation Model, BASINS, and HSPF.

***Coke Point Offshore Human Health and Ecological Risk Assessment; Maryland Environmental Service for the Maryland Port Administration; Project Statistician***—Provided statistical analysis and technical review for the risk assessment for the Coke Point offshore area. Developed kriging models for human health and ecological risk in surface sediment. Conducted a sensitivity analysis to evaluate the impact of alternative approaches to assessing risk in the study area.

***FY08 Evaluation of Dredged Material: Federal Navigation Channels in Baltimore Harbor and Chesapeake Bay, Maryland and Virginia; USACE–Baltimore District; Project Manager***—Provided statistical analysis for sediment characterization studies of 19 federally-maintained navigation channel segments in Baltimore Harbor, Upper Chesapeake Bay, Maryland and Lower Chesapeake Bay, Virginia. Assessment included development of statistical evaluation protocols for comparing sediment quality in various channels from 1995 to 2008 and maximizing the sampling efficiency using power analysis of a mixed spatial and temporal variance component model.

***Hart-Miller Island Monitoring Program Evaluation; Maryland Port Administration; Project Manager and Statistician***—Evaluated the long-term monitoring of exterior sediment chemistry, benthic tissue chemistry, and benthic community assessment for the Hart-Miller Island Dredged Material Containment Facility.

***Mixing Zone Modeling for Stormwater Discharges from the Washington Navy Yard to the Tidal Anacostia River; Washington Navy Yard; Environmental Scientist***—Developed stormwater models using an EPA SWMM to predict outfall hydrographs during design storms. Developed an innovative approach to determining the allowable acute and chronic mixing zones through the use of probabilistic analysis of long-term continuous modeling. Conducted waste load allocation and reasonable potential analysis for metals in stormwater discharge. Developed a study plan for determining a site-specific mixing zone for stormwater discharges to the Anacostia River.

***City of Baltimore Watersheds Restoration Project; City of Baltimore; Environmental Modeler/Statistician***—Developed a fish and macroinvertebrate stream monitoring program for three watersheds in the City of Baltimore. Develop optimized sampling protocols for characterizing watershed status and detecting temporal trends. Developed and calibrated an EPA SWMM model to simulate stormwater runoff, constituent buildup/washoff, and pollutant transport. Applied the calibrated models to compute peak flows and constituent loadings (nitrogen phosphorus, suspended solids, copper, lead, chromium, and zinc) during storm conditions.

***City of Baltimore Watersheds NPDES Support; City of Baltimore; Watershed Modeler***—Annual calibration of stormwater management model for Moores Run watershed in Baltimore City. The model simulated stormwater runoff, and loading of total suspended solids, nitrogen, phosphorus, copper, lead, and zinc. The calibrated model was used to estimate total annual constituent loadings generated within the watershed.

### **Qualifications**

#### **Education**

M.S.; Johns Hopkins University; Environmental Engineering; 2005  
M.S.; University of Maine; Zoology; 1997  
B.S.; University of Wisconsin; Zoology; 1990

#### **Specialized Training**

EA Project Management Training; 2007  
Society of Environmental Toxicology and Chemistry Course on Geographic Information System-Based Modeling; 2001  
Principles of Water Quality Modeling with EPA Water Quality Analysis and Simulation Program; AsCI Corp.; 1999  
CPR and First Aid Training

#### **Professional Affiliations/Appointments**

Society of Environmental Toxicology and Chemistry  
Water Environment Federation

#### **Experience**

Years with EA: 14                      Total Years: 19



**Attachment 2**  
**Costing and Assumptions**

**EA Engineering, Science, and Technology, Inc.**  
**Level-of-Effort (LOE) Assumptions for Cost Proposal**  
**Sparrows Point Trust – Offshore Investigation Services**  
**12 March 2014**

**Task 1 – Review of Existing Documents**

1. EA is familiar with data and information from the surrounding area (offshore and upland) of the Sparrows Point Facility. As such, estimated costs for Task 1 include a reduced amount of effort to re-familiarize the EA team with existing information.
2. Estimated costs include accessing available Bear Creek sediment sampling data from the Comprehensive Harbor Assessment and Regional Model (CHARM) Study (1996-2000). It is assumed that such data (only from Bear Creek) will be useful to assess far-field conditions (at a distance from the shoreline).

**Task 2 - Phase I Subaqueous Survey**

1. Bathymetric, side scan sonar, and visual shoreline survey includes only the Phase I area.
2. The field effort will be performed by the field lead and a technician over a contiguous, one-week (6-day) period. The technician will also perform duties related to preparation of the technical memorandum presenting the proposed approach and methods, field mobilization, and data processing and analysis.
3. An ODOM Hydrotrac survey fathometer interfaced with a narrow-beam, 200 kHz transducer will be employed to measure individual water depths to a resolution of 1.0 cm and evaluate seafloor topography.
4. Survey lines for the bathymetric survey will be oriented shore-normal and spaced at 50 ft intervals, extending from the navigable limits of shoreline 200 ft into the main stem of Bear Creek.
5. Assuming characterization of the 10,000 linear feet of shoreline identified in the RFP, approximately 200 main scheme survey lines will be occupied during the bathymetric survey.
6. A shallow draft Jon boat powered by an outboard motor will be sufficient to serve as the primary survey platform.
7. Raw depth soundings will be reviewed, corrected for water column sound velocity, and then normalized to a vertical datum of mean lower low water (MLLW). Erroneous data points associated with cavitation in the water column or suspect data points will be flagged and removed from further processing and output.
8. At the proposed level of resolution, these data will be suitable for general characterization of the survey area, identification of sampling locations representative of benthic habitat, and first-order planning adequate as input to a Corrective Measures Study.
9. An EdgeTech 4200 side scan sonar unit will be used to image the seafloor within the work site as a means to evaluate seafloor composition and identify debris. The survey

coverage will extend from the approximate low tide line out 200 ft into the main stem of Bear Creek.

10. A dual frequency (300/900kHz) side scan sonar system will be towed along four survey lines approximately 10,000 ft in length oriented parallel to the Phase 1 Northwest shoreline. The survey lines will be spaced 40 ft apart and the sonar range will be controlled to yield >200% coverage of the seafloor.
11. Additional, single-beam bathymetry data will be collected concurrently with the side scan sonar survey, allowing data to be obtained along multiple tie lines, which will serve as a Quality Assurance measure for the main scheme survey line data described above.
12. The shoreline survey will be accomplished as a shoreline walk along the approximate low tide line along the Phase 1 Northwest shoreline to assess its composition and level of disturbance relative to a natural state. The survey team will record digital still photographs and geographic coordinates of noteworthy anthropogenic features (i.e., outfalls, sizable debris, slag deposits, etc.), as well as other significant features (i.e., ground water seeps, surface slicks, odors, biological activity, etc.)
13. A shallow draft Jon boat may, at times, be required to transport personnel and equipment into portions of the shoreline survey (along sections of the shoreline too unstable or difficult to traverse by walking).
14. The proposed cost does not include schedule delays associated with inclement weather. In order to comply with health and safety requirements, EA reserves the right to adjust approach and associated costs if project execution is delayed until winter months.
15. For the purposes of this proposal, the LOE assumes the preparation of a technical memorandum describing the proposed approach and methods used to conduct the subaqueous survey. In addition, the LOE includes responding to one set of USEPA and MDE comments and finalization of the technical memorandum.
16. Assumed document submittal will be in electronic format, though some hardcopy reproduction may be necessary for internal preparation.

### **Task 3 – Offshore Investigation Workplan**

1. A work plan will be developed to describe the approach and methods for conductance of an Offshore Investigation, which will include sediment, storm water and pore water sampling, risk assessment, and surface water modeling.
2. The work plan will include approaches and methods for implementing Phase I and Phase II Offshore Investigations, although it is understood that implementation of Phase II will occur only if sufficient funding is available.
3. The specific elements of the scope of work summarized in RFP Section 2.3 will be addressed in the work plan.
4. A section of the work plan will address Quality Assurance/Quality Control (QA/QC) methodology (rather than a separate Quality Assurance Project Plan).
5. Estimated cost for this task includes submittal of a draft work plan to the Trust, USEPA, and MDE, a single round of response to comments, and finalization of the work plan.

6. Estimated cost includes document submittal in electronic format, though some hardcopy reproduction is necessary for internal preparation.

#### **Task 4 – Phase I Offshore Investigation**

1. The sampling strategy for sediment (surface and subsurface), stormwater, and pore water proposed by EA is shown in the figure attached to this cost proposal.
2. The proposed sediment and pore water sampling strategy is designed to be spatially representative of the Northwest Shoreline, while exhibiting some bias toward areas of stormwater discharge and preferential groundwater flowpaths. Such preferential flow pathways in groundwater may exist in areas where slag fill was placed historically, such as north of Grey's Landfill and Humphrey's Impoundment (see sampling figure).
3. LOE and costs for Task 4 have been optimized with a step-wise approach to conductance of initial Phase I Investigation activities. For costing purposes, EA has proposed a strategy to initially collect surface sediment samples to identify locations of sediment containing Contaminants of Potential Concern (COPCs). Eighteen surface sediment locations (20 samples including Quality Control [QC]) are proposed for collection in Task 4A. After evaluating the results of surface sediment data for COPCs, a second round of sampling (Task 4B) will be conducted for pore water and subsurface sediment based on COPC delineation in Task 4A. Such a strategy will allow for cost efficiencies (relative to a single, large mobilization). For the purpose of this proposal, 9 pore water sampling locations (10 samples including QC) and 20 subsurface sediment samples have been scoped herein.
4. A shallow draft Jon boat powered by an outboard motor will be sufficient to serve as the primary means for collection of surface sediment, subsurface sediment, and pore water. For purposes of cost estimation, samples of surface sediment, subsurface sediment, and pore water, respectively, will be collected by Ponar, manually driven AMS core samplers, and drop tubes inserted in manually driven push-point probes. It is assumed that a peristaltic pump will be used to draw pore water from the push-point probes.
5. In addition to analyzing pore water for COPCs, pore water and the bottom of the surface water column will be monitored real-time with field instrumentation for the following parameters: conductance, pH, total dissolved solids, oxidation reduction potential (ORP), and temperature.
6. EA will collect manual surface water grab samples at predetermined locations of the 6 active stormwater outfalls along the Northwest Shoreline. USEPA and MDE approved methods will be used to collect samples directly within a water body or storm water control mechanism (outfalls, drainage swales, or retention ponds). As per the Phase I Investigation sampling schedule presented in the RFP, stormwater sampling will be conducted during a one (1) month period. It is anticipated that two (2) storm events will be sampled per outfall resulting in a total of 12 stormwater samples.
7. For stormwater sampling, assumes two storms will be sampled using a 2-person field crew during a 12-hr field day.



8. Assumes that each stormwater sample will consist of a single discrete grab sample collected from the outfall discharge or accessible upstream location.
9. Assumes that stormwater sampling locations are accessible from onshore and that site access will be granted.
10. For each of the two stormwater sampling events, the following samples will be collected and submitted for laboratory analysis: 6 stormwater samples, 1 field duplicate, and 1 field blank.
11. The proposed cost does not include schedule delays associated with inclement weather. In order to comply with health and safety requirements, EA reserves the right to adjust approach and associated costs if project execution is delayed until winter months.

#### **Task 5 – Phase I Data Gaps Report**

1. Estimated cost for this task includes only a data gap assessment (defining the limits of contamination and whether the data are suitable to conduct a human health and ecological risk assessment) and does not include additional data collection. The Data Gap Report will be issued as a separate document from the Phase I Offshore Investigation Report to allow for the option of additional data collection prior to reporting.
2. Estimated cost assumes that the methods and approaches to fill the data gaps will be proposed in the Data Gaps Report of this Task.
3. Estimated cost includes submittal of a draft Data Gaps Report to the Trust, USEPA, and MDE, a single round of response to comments, and finalization of the report.
4. Estimated cost includes document submittal in electronic format, though some hardcopy reproduction is necessary for internal preparation.

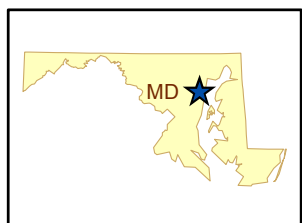
#### **Task 6 – Additional Phase I Offshore Characterization**

1. Estimated cost assumes that the scope for any additional offshore characterization will be based on the recommendations presented in the Data Gaps Report.
2. For the purposes of this proposal, estimated cost assumes that the LOE required for the additional offshore characterization is based on a scaled value of 30% of the Phase I effort. A low percentage is assumed because of the value in the step-wise approach utilized in the Phase I. Additionally, subsurface sediment samples will be collected during the Phase I effort.
3. The proposed cost does not include schedule delays associated with inclement weather. In order to comply with health and safety requirements, EA reserves the right to adjust approach and associated costs if project execution is delayed until winter months.

#### **Task 7 – Offshore Investigation Report**

1. For modeled estimates of potential surface water exposure concentrations, COPCs will be modeled as conservative tracers in the surface water environment.
2. A maximum of three modeling scenarios (with up to 24 COPC simulations) will be conducted.

3. Participation of the ecological risk assessor and senior technical reviewer in 4 calls, with a small amount of preparation for each call.
4. Assessor will prepare a section of the work plan that establishes approach for the ecological risk assessment (ERA). This approach will be drawn from the Coke Point ERA previously performed for the Maryland Port Administration (MPA).
5. Data management and statistics will be limited to new sampling data and a limited amount of historical data for the Phase I area. A combined risk assessment of Phase I and Coke Point data will not be performed.
6. Background assessment will be based entirely upon results of previous assessment, and will not include evaluation of new datasets; as such, background values will not be available for all analytical suites.
7. Risk assessment format and tables will be consistent with those produced for the Coke Point risk assessment. Some new chemical analytical suites may be included, and will require update of benchmarks and exposure models/parameters.
8. Food web modeling will rely on literature-based bioaccumulation factors or site-specific factors developed for Coke Point.
9. A small number of maps (2 to 3) will be presented to show the distribution of chemicals in sediment; these maps will not include kriging or spatial statistical analysis of chemical concentrations or risk values.
10. Correspondence on the Human Health Risk Assessment (HHRA) will be addressed in the same conference calls as for the ERA.
11. Work plan approach for the HHRA will also be similar to Coke Point HHRA performed for the MPA; however, only one set of exposure scenarios for affected populations will be evaluated.
12. Data management hours take into account that ERA/HHRA share some components and preparation of the database is under Task 4.
13. The RFP noted the use of the EPA RSL calculator for the screening of sediment and surface water. EA will use the calculator or spreadsheets prepared for the Coke Point HHRA, depending on which is more cost effective for integration into the database.
14. The HHRA and calculation spreadsheet templates from the Coke Point HHRA will be modified and utilized to realize cost efficiencies. Receptors will be evaluated with similar site-specific exposure parameters. Site-specific exposure parameters include age range of receptors, fish ingestion rate, rate of contact with surface water and sediment, and routes of exposure.
15. For the Phase I Offshore Investigation Report, a single round of comments from the Trust, USEPA, and MDE will be received. Consequently, a single round of revisions will be required; it is assumed that revisions will not require substantive changes to risk assessment approach, calculations, or form and format.
16. Estimated cost includes document submittal in electronic format, though some hardcopy reproduction is necessary for internal preparation.

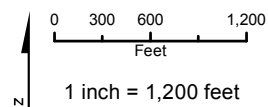


### Legend

- Phase 1 Northwest Shoreline
- Perennial Creek/Stream

### Sampling Locations

- Proposed Sediment Sampling Location
- Proposed Stormwater Sampling Location
- ▲ Proposed Pore Water Sampling Location



## Phase I Northwest Shoreline Sparrows Point Environmental Trust Baltimore, Maryland

Map Date: March 2014  
Image Source: ESRI 2011  
Projection: NAD 1983 StatePlane  
Maryland FIPS 1900 (US Feet)

